We claim:

1. A reaction product comprising polyether carbamate groups, said reaction product formed from:

(A) at least one polyoxyalkylene amine selected from the group consisting of polyoxyalkylene monoamine, polyoxyalkylene diamine, polyoxyalkylene triamine, and mixtures thereof,

wherein the polyoxyalkylene diamine comprises a compound having the following structure (I):

(I)

where R^1, R^2, and R^3 can be the same or different and each independently represent a C_2 to C_{12} alkylene group, and (n + m) represents a value greater than 2, provided that when R^1 and R^3 are different (n + m) represents a value greater than or equal to 2; and

(B) at least one cyclic carbonate,

wherein a ratio of equivalents of amine (A) to equivalents of cyclic carbonate (B) ranges from 1:0.5 to 1:1.5.

2. The reaction product of claim 1, wherein the ratio of equivalents of amine (A) to equivalents of cyclic carbonate (B) ranges from 1:0.8 to 1:1.1.

3. The reaction product of claim 1, wherein the ratio of equivalents of amine (A) to equivalents of cyclic carbonate (B) ranges from 1:0.9 to 1:1.1.

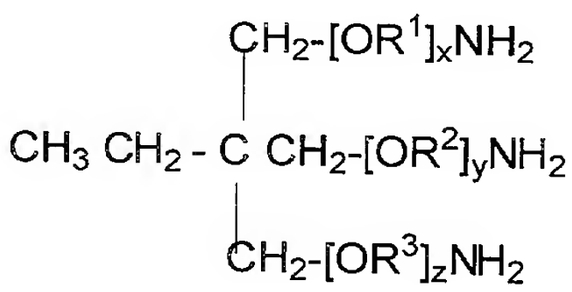
4. The reaction product of claim 1, wherein at least a portion of the reaction product is hydroxy-terminated.

5. The reaction product of claim 1, wherein R^1, R^2, and R^3 can be the same or different and each independently represents an alkylene group selected from ethylene, propylene, and butylene; and
(n + m) represents a value greater than 2, provided that when R^1 and R^3 are different, (n + m) is equal to or greater than 2.

6. The reaction product of claim 1, wherein R^1, R^2, and R^3 can be the same or different and each independently represents an alkylene group selected from ethylene and propylene, and (n + m) represents a value greater than 2, provided that when R^1 and R^3 are different, (n + m) is equal to or greater than 2.

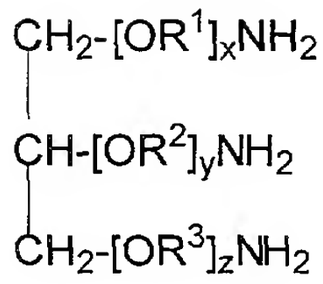
7. The reaction product of claim 6, wherein $5 \leq (n + m) \leq 6$.

8. The reaction product of claim 1, wherein the polyoxyalkylene triamine comprises a triamine having the following structure (II) or (III):



(II)

or

(III) 

wherein R^1, R^2, and R^3 independently can be the same or different and each independently represents a moiety selected from ethylene, propylene, and butylene, and x, y, and z independently can be the same or different, and each independently represents a value greater than or equal to 1.

9. The reaction product of claim 1, wherein the cyclic carbonate is selected from the group consisting of ethylene carbonate, propylene carbonate, butylene carbonate, glycerine carbonate, and mixtures thereof.

10. The reaction product of claim 9 wherein the cyclic carbonate is selected from at least one of ethylene carbonate, propylene carbonate, and butylene carbonate.

11. A reaction product comprising polyether carbamate groups, said reaction product formed from :

(A) at least one polyoxyalkylene amine, and

(B) at least one cyclic carbonate selected from propylene carbonate, butylene carbonate, glycerine carbonate, and mixtures thereof,

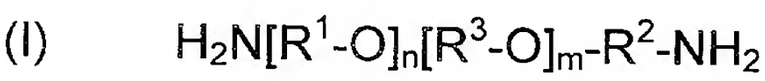
wherein a ratio of equivalents of amine (A) to equivalents of cyclic carbonate (B) ranges from 1:0.5 to 1:1.5.

12. The reaction product of claim 11, wherein the ratio of equivalents of amine (A) to equivalents of cyclic carbonate (B) ranges from 1:0.8 to 1:1.1

13. The reaction product of claim 11, wherein the ratio of equivalents of amine (A) to equivalents of cyclic carbonate (B) ranges from 1:0.9 to 1:1.1.

14. The reaction product of claim 11, wherein the polyoxyalkylene amine (A) is selected from the group consisting of polyoxyalkylene monoamine, polyoxyalkylene diamine, polyoxyalkylene triamine, and mixtures thereof.

15. The reaction product of claim 14, wherein the polyoxyalkylene diamine comprises a compound having the following structure (I):



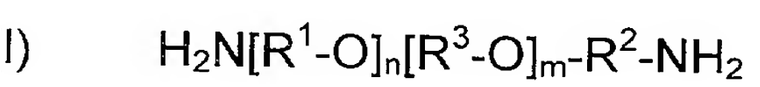
(I)

where R^1, R^2, and R^3 can be the same or different and each independently represent a C_2 to C_{12} alkylene group, and (n + m) represents a value greater than 2, provided that when R^1 and R^3 are different (n + m) represents a value greater than or equal to 2

16. A reaction product prepared by the following steps:

(a) admixing at least one cyclic carbonate, and

at least one polyether amine selected from the group consisting of polyoxyalkylene monoamine, polyoxyalkylene diamine, polyoxyalkylene triamine, and mixtures thereof, wherein the polyoxyalkylene diamine comprises a compound having the following structure (I):



(I)

where R^1, R^2, and R^3 can be the same or different and each independently represent a C_2 to C_{12} alkylene group, and (n + m) represents a value greater than 2, provided that when R^1 and R^3 are different (n + m) represents a value greater than or equal to 2,

optionally, in the presence of an alkoxide catalyst, to form a reaction mixture such that the ratio of equivalents of amine to equivalents of cyclic carbonate is 1:0.5 to 1:1.5; and

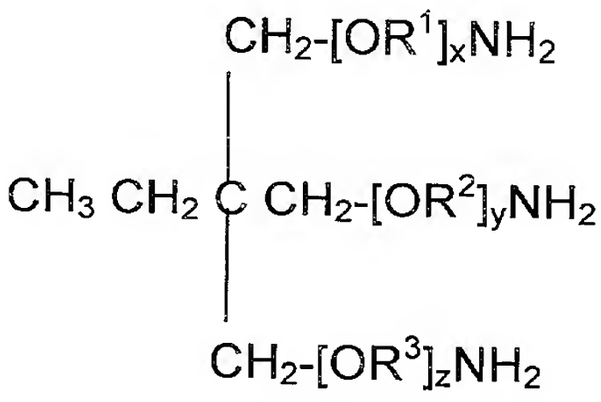
(b) maintaining the reaction mixture of step (a) at a temperature ranging from ambient temperature to 150°C at atmospheric pressure for a period of time sufficient to drive the reaction to 80 percent of theoretical completion.

17. The reaction product of claim 16, wherein the ratio of equivalents of amine to equivalents of cyclic carbonate ranges from 1:0.8 to 1:1.1.

18. The reaction product of claim 16, wherein the temperature of the reaction admixture is maintained between ambient temperature and 150°C at atmospheric pressure for a period of time sufficient to drive the reaction to 90 percent of theoretical completion.

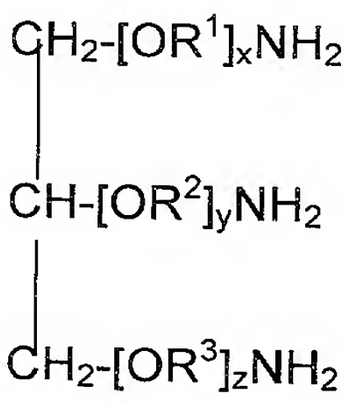
19. The reaction product of claim 16, wherein the polyoxyalkylene triamine comprises a triamine having the following structure (VI) or the structure (VII):

(VI)



or

(VII)



wherein R^1, R^2, and R^3 independently can be the same or different and each independently represents a moiety selected from ethylene, propylene, and butylene, and x, y, and z can be the same or different and each independently represents a value greater than or equal to 1.

20. The reaction product of claim 16, wherein the cyclic carbonate is selected from the group consisting of ethylene carbonate, propylene carbonate, butylene carbonate, glycerine carbonate, and mixtures thereof.

21. The reaction product of claim 16, wherein the cyclic carbonate is selected from at least one of ethylene carbonate, propylene carbonate, and butylene carbonate.

22. In a curable coating composition comprising:

(1) a reactive functional group-containing polymer, and

(2) a curing agent having functional groups reactive with the functional groups of (A),

the improvement comprising the inclusion in the coating composition of (3) at least one reaction product of the following reactants:

(1) at least one polyoxyalkylene amine selected from the group consisting of polyoxyalkylene monoamine, polyoxyalkylene diamine, polyoxyalkylene triamine, and mixtures thereof,

wherein the polyoxyalkylene diamine comprises a compound having the following structure (I):

(I) $H_2N[R^1\text{-}O]_n[R^3\text{-}O]_m\text{-}R^2\text{-}NH_2$

where R^1, R^2, and R^3 can be the same or different and each independently represent a C_2 to C_{12} alkylene group, and (n + m) represents a

value greater than 2, provided that when R^1 and R^3 are different (n + m) represents a value greater than or equal to 2, and

(2) at least one cyclic carbonate.

wherein a ratio of equivalents of amine (A) to equivalents of cyclic carbonate (B) ranges from 1:0.5 to 1:1.5.

23. The coating composition of claim 22, wherein the reaction product (3) is present in an amount sufficient to provide viscosity stability of the composition such that the viscosity of the composition increases not more than 50% upon storage for 16 hours at a temperature ranging from 49°C to 71°C.

24. The coating composition of claim 22, wherein the reaction product (3) is present in an amount sufficient to provide viscosity stability of the composition such that the viscosity of the composition increases not more than 35% upon storage for 16 hours at a temperature ranging from 49°C to 71°C.

25. The coating composition of claim 22, wherein the reaction product (3) is present in an amount sufficient to provide viscosity stability of the composition such that the viscosity of the composition increases not more than 20% upon storage for 16 hours at a temperature ranging from 49°C to 71°C.

26. The curable coating composition of claim 22, wherein the ratio of equivalents of amine (A) to equivalents of cyclic carbonate (B) ranges from 1:0.8 to 1:1.1.

27. The curable coating composition of claim 22, wherein the ratio of equivalents of amine (A) to equivalents of cyclic carbonate (B) ranges from 1:0.9 to 1:1.1.

28. The curable coating composition of claim 22, wherein R^1, R^2, and R^3 can be the same or different and each independently represents a moiety selected from ethylene, propylene, and butylene.

29. The curable coating composition of claim 22, wherein R^1, R^2, and R^3 can be the same or different and each independently represents a moiety selected from ethylene and propylene.

30. The curable coating composition of claim 22, wherein the cyclic carbonate comprises a cyclic carbonate selected from the group consisting of ethylene carbonate, propylene carbonate, butylene carbonate, glycerine carbonate, and mixtures thereof.

31. The curable coating composition of claim 22, wherein the cyclic carbonate is selected from at least one of ethylene carbonate, propylene carbonate, and butylene carbonate.

32. The curable coating composition of claim 22, wherein the reaction product (3) is present in an amount ranging from 5 to 25 weight percent resin solids, based on weight of total resin solids present in the composition.

33. The curable coating composition of claim 22, wherein the reaction product (3) is present in an amount ranging from 10 to 20 percent resin solids, based on weight of total resin solids present in the composition.

34. The curable coating composition of claim 22 wherein the composition comprises a water-based composition.

35. The curable coating composition of claim 22 wherein the composition comprises solvent-based composition.

36. In a multilayer composite coating comprising a first coating layer deposited over at least a portion of a substrate from a first curable coating composition, and a second coating layer deposited over at least a portion of the first coating layer, the second coating layer formed from a second curable coating composition,

the first curable coating composition comprising:

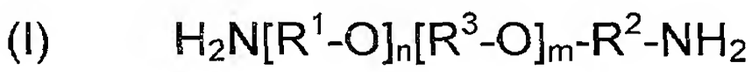
(1) a reactive functional group-containing polymer; and

(2) a curing agent having functional groups reactive with the functional groups of (1),

the improvement comprising the inclusion in the first curable coating composition of (3) at least one reactive product of the following reactants:

(A) at least one polyoxyalkylene amine selected from the group consisting of polyoxyalkylene monoamine, polyoxyalkylene diamine, polyoxyalkylene triamine, and mixtures thereof,

wherein the polyoxyalkylene diamine comprises a compound having the following structure (I):



(I)

where R^1, R^2, and R^3 can be the same or different and each independently represent a C_2 to C_{12} alkylene group, and (n + m) represents a value greater than 2, provided that when R^1 and R^3 are different (n + m) represents a value greater than or equal to 2; and

(B) at least one cyclic carbonate,

wherein the ratio of equivalents of amine (A) to equivalents of cyclic carbonate (B) ranges from 1:0.5 to 1.5.

37. The multilayer composite coating of claim 36, wherein the ratio of equivalents of amine (A) to equivalents of cyclic carbonate (B) ranges from 1:0.8 to 1.1.

38. The multilayer composite coating of claim 36, wherein wherein the ratio of equivalents of amine (A) to equivalents of cyclic carbonate (B) ranges from 1:0.9 to 1.1.

39. The multilayer composite coating of claim 36, wherein the reaction product (3) is present in the first coating composition in an amount sufficient to provide at least 50% interlayer adhesion between the first and second coating layers as determined in accordance with ASTM D3359-97.

40. The multilayer composite coating of claim 36, wherein the reaction product (3) is present in the first coating composition in an amount sufficient to provide at least 75% interlayer adhesion between the first and second coating layers as determined in accordance with ASTM D3359-97.

41. The multilayer composite coating of claim 36, wherein the reaction product (3) is present in the first coating composition in an amount sufficient to provide at least 80% interlayer adhesion between the first and second coating layers as determined by ASTM D3359-97.

42. The multilayer composite coating of claim 36, wherein the reaction product (3) is present in the first coating composition in an amount ranging from 1 to 50 weight percent resin solids, based on the total weight of the resin solids present in the first coating composition.

43. The multilayer composite coating of claim 36, wherein the reaction product (3) is present in the first coating composition in an amount ranging from 5 to 25 weight percent resin solids, based on the total weight of the resin solids present in the first coating composition.

44. The multilayer composite coating of claim 36, wherein the cyclic carbonate comprises a cyclic carbonate selected from the group consisting of ethylene carbonate, propylene carbonate, butylene carbonate, glycerine carbonate, and mixtures thereof.

45. The multilayer composite coating of claim 36, wherein the cyclic carbonate is selected from at least one of ethylene carbonate, propylene carbonate, and butylene carbonate.

46. The multilayer composite coating of claim 36, wherein the first coating layer comprises one or more pigments and the second coating layer is substantially pigment free.

47. The multilayer composite coating of claim 36, wherein the first coating layer comprises one or more pigments, and the second coating layer comprises one or more pigments.

48. The multilayer composite coating of claim 36, wherein the first coating layer is substantially pigment free and the second coating layer comprises one or more pigments.

49. The multilayer composite coating of claim 22, wherein the first coating layer is substantially pigment free and the second coating layer comprises is substantially pigment free.

50. In a multilayer composite coating comprising a first coating layer deposited over at least a portion of a substrate from a first curable coating composition and a second coating layer deposited over at least a portion of the first coating layer, the second coating layer formed from a second curable coating composition, the first curable coating composition comprising:

(1) one or more hydroxyl functional polymers selected from the group consisting of a hydroxy-functional polyurethane polymer, a hydroxy-functional acrylic polymer, and mixtures thereof, and

(2) an aminoplast curing agent,

the improvement comprising the inclusion in the first coating composition of (3) at least one reaction product of the following reactants:

(A) a polyisopropylether diamine, and

(B) an ethylene carbonate,

wherein the ratio of equivalents of amine (A) to equivalents of cyclic carbonate (B) ranges from 1:0.9 to 1:1.1;

wherein the reaction product (3) is present in the first curable coating composition at a level ranging from 10 to 20 weight percent resin solids, based on weight of total resin solids present in first curable coating composition.

51. A coated substrate comprising a substrate and a cured coating layer over at least a portion of the substrate, the cured layer formed from the curable coating composition of claim 1.

52. A coated substrate comprising a substrate and a cured coating layer over at least a portion of the substrate, the cured layer formed from a curable coating composition comprising:

(1) a reactive functional group-containing polymer, and

(2) a curing agent having functional groups reactive with the functional groups of (A),

the improvement comprising the inclusion in the coating composition of (3) at least one reaction product of the following reactants:

(A) at least one polyoxyalkylene amine selected from the group consisting of polyoxyalkylene monoamine, polyoxyalkylene diamine, polyoxyalkylene triamine, and mixtures thereof, wherein the polyoxyalkylene diamine comprises a compound having the following structure (I):

(I) $H_2N[R^1\text{-}O]_n[R^3\text{-}O]_m\text{-}R^2\text{-}NH_2$

where R^1, R^2, and R^3 can be the same or different and each independently represent a C_2 to C_{12} alkylene group, and (n + m) represents a value greater than 2, provided that when R^1 and R^3 are different (n + m) represents a value greater than or equal to 2; and

(B) at least one cyclic carbonate,

wherein the ratio of equivalents of amine (A) to equivalents of cyclic carbonate (B) ranges from 1:0.8 to 1:1.1,

characterized in that the reaction product (3) is present in the coating composition in an amount sufficient to provide at least 50% adhesion between the coating and substrate as determined in accordance with ASTM-D3359-97.

53. The coated substrate of claim 52 wherein the reaction product (3) is present in the coating composition in an amount sufficient to provide at least 75% adhesion between the coating and substrate as determined in accordance with ASTM-D3359-97.

54. The coated substrate of claim 52 wherein the reaction product (3) is present in the coating composition in an amount sufficient to provide at least 80% adhesion between the coating and substrate as determined in accordance with ASTM-D3359-97.